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August 5, 1994

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: IC Docket No. 94-31

Dear Mr. Caton:

On behalf of Ellipsat Corporation, I am transmitting herewith an original and five copies of its reply comments in the above-referenced proceeding.

Should there be any questions concerning this matter, kindly communicate with the undersigned.

Sincerely,


Jill Abeshouse Stern

JAS:pad

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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OFFICE OF SECRETARY

In the Matter of)	
)	
Preparation for International)	IC Docket No. 94-31
Telecommunication Union World)	
Radiocommunication Conferences)	

REPLY COMMENTS OF ELLIPSAT CORPORATION

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August 5, 1994

SUMMARY

Ellipsat Corporation recommends that the United States make every effort at the upcoming World Radiocommunication Conference (WRC-95) to resolve critical issues affecting implementation of global LEO MSS systems like ELLIPSO™. In the view of Ellipsat, and other LEO parties who submitted opening comments in this proceeding, the most important issues from the MSS standpoint are: (1) availability of sufficient feeder link spectrum below 15 GHz; (2) relocation of GLONASS below 1606 MHz; (3) rapid availability of additional MSS spectrum in the 2 GHz band for system expansion; and (4) revision of various radio regulations including Footnote 731E, Footnote 753F and Footnote 733E.

The opening comments underscore the need for C-Band feeder link allocations to accommodate diverse system designs. Nothing in the comments dissuades Ellipsat from the conclusion reached by ITU Task Group 4/5 that reverse band working in the FSS bands is technically feasible and offers a promising spectrum sharing technique for feeder links. The United States should support allocation and appropriate rule changes to permit use of the C-Band, and a range of frequency bands, for LEO MSS feeder links.

The United States must strongly resist any efforts by other Administrations to restrict LEO feeder links to the 20/30 GHz bands. The opening comments in this proceeding indicate the increasingly congested nature of the Ka-Band and also detail the

substantial costs that would be involved in mandating use of the Ka-Band for all LEO MSS feeder links.

The opening comments of LEO parties unanimously agree that additional spectrum for LEO MSS should also be a high-priority matter. A range of options in the 2 GHz band are suggested in the comments, including acceleration of the availability of MSS spectrum allocated at WARC-92. This additional spectrum is critical for development and planning of second-generation MSS systems. All of the options proposed in the comments should be considered carefully through the working group and advisory committee process, and more specific frequency recommendations made as WRC-95 preparation proceeds.

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REPLY COMMENTS OF
ELLIPSAT CORPORATION

Ellipsat Corporation ("Ellipsat"), by its attorneys, hereby submits its reply comments with respect to the Notice of Inquiry ("Notice") in the above-captioned proceeding.^{1/} It is hoped that these reply comments, and Ellipsat's initial comments filed July 15, 1994, will assist the Commission in developing recommendations for the upcoming 1995 World Radiocommunication Conference ("WRC-95").

I.
SUMMARY OF POSITION

In its July 15, 1994 comments, Ellipsat urged the Commission to utilize the opportunity presented by WRC-95 to address and resolve important issues affecting implementation of the proposed low-Earth-orbiting (LEO) mobile satellite systems, including the ELLIPSO™ system. In particular, Ellipsat identified feeder links, GLONASS, future spectrum availability and coordination

^{1/} IC Docket No. 94-31, FCC 94-96, released May 5, 1994.

issues as primary concerns. Ellipsat's recommendations with respect to these issues can be summarized as follows.

Feeder Link Spectrum. The United States should seek allocations below 15 GHz for LEO feeder links. Ellipsat's preference is to use the 4500-4800 MHz band for feeder uplinks and 6725-7025 MHz for feeder downlinks; the 5000-5250 MHz band would also be suitable for LEO uplinks. While these are Ellipsat's preferred options, it recommended -- as did other parties -- that the United States take appropriate steps to achieve feeder link allocations for LEO systems in a range of frequencies in the C and Ku-Bands on a reverse band working (RBW) basis. Based on the comments, RBW appears to be a promising technique that merits consideration.

GLONASS. Relocation of GLONASS below 1606 MHz should be a high priority at WRC-95 in the view of Ellipsat and other parties. The United States must support revision of footnote 731E to eliminate the ambiguity concerning the degree of protection to be afforded the GLONASS system and take other appropriate steps to facilitate GLONASS relocation below 1606 MHz.

Spectrum Availability. At WRC-95, the U.S. should support the more rapid availability of MSS spectrum in the 2 GHz bands and propose the allocation of additional MSS spectrum, on a worldwide basis, for second generation MSS systems.

Power Flux Density Limits. In its comments, Ellipsat supported a modest relaxation of the power flux density values for

the 2483.5-2500 MHz band, treatment of these values as coordination triggers rather than absolute limits, and appropriate revisions of international radio regulation 2566 to accomplish this.

The comments of other parties in this proceeding overwhelming share the above positions, and stress the importance of using the opportunity presented by WRC-95 to resolve fundamental MSS implementation issues as expeditiously as possible.

II.

THE OPENING COMMENTS UNDERSCORE THE NEED FOR C-BAND FEEDER LINK ALLOCATIONS

In its initial comments, Ellipsat identified feeder links as perhaps the most critical issue, from the standpoint of MSS implementation, to be resolved at WRC-95. Ellipsat emphasized the importance of accommodating all MSS feeder link assignment requests to the extent possible. To that end, Ellipsat urged the United States to take all steps necessary to achieve feeder link allocations in the C-Band and other bands below 15 GHz. These allocations are needed to ensure that ELLIPSO™ and other MSS systems will be able to implement their systems, as designed, and to provide the low-cost, ubiquitous telecommunications services they propose.

After reviewing the comments of other parties in this proceeding, it is clear that broad support exists for the following United States positions which would result in sufficient feeder link spectrum for the LEO systems.

A. Spectrum Below 15 GHz Should Be Allocated

The comments underscore the importance of sufficient feeder link allocations below 15 GHz for the LEO systems. As Ellipsat and other LEO applicants pointed out in the opening comments, the cost of modifying system design to use feeder links above 15 GHz is substantial, would ultimately raise cost of service to the public, and place a disproportionate burden on system designs which rely upon multiple ground switching networks to connect mobile users into the PSTN (in contrast to inter-satellite links.)^{2/} For these reasons, most of the LEO systems view the Ka-Band as a "last resort" for feeder links.^{3/}

In its comments, Ellipsat expressed concern about the unavailability of sufficient spectrum in the increasingly congested Ka-Band, which is subject to multiple, competing terrestrial and satellite uses. In this regard, it is noteworthy that Teledesic strongly objects in its comments to extensive use of the Ka-Band for LEO feeder links. Indeed, Teledesic indicates in its comments (pp. 9-13) that if all five MSS Above 1 GHz systems are required to use the Ka-Band for feeder links, the operations of the proposed FSS systems would be "compromised."

^{2/} See, e.g., Loral Comments at 6-7.

^{3/} See Comments of Comsat Mobile Communications at 19.

B. C-Band is the Preferred Option

In its comments, Ellipsat expressed a strong preference for C-Band feeder links. Ellipsat estimates that bandwidths in the range of 200-300 MHz (in each direction) will be required to support the LEO feeder link transmissions in the C-Band. Preferred feeder link assignments for the ELLIPSO™ system are 4500-4800 MHz (uplink) and 6725-7025 MHz (downlink) bands in the reverse band mode. The 5000-5250 MHz band is an important band suitable for LEO use and would require minimal coordination outside the United States relative to other C-band frequencies potentially suitable for feeder links.^{4/} This is an important consideration because of the need for global availability of the feeder link frequencies.

Similarly, Loral, Constellation, Air Touch Communications and others have also indicated the desirability of C-Band frequencies. Constellation supports the use of 5150-5216 MHz and 6525-6591 MHz (downlinks) for feeder links. Loral recommends 5000-5250 MHz (uplinks) and 6425-7075 MHz (preferably 6875-7075 MHz) for feeder downlinks. Comsat Mobile Communications found sharing possible in the 6650-6725, 6725-7025 and 7025-7075 MHz

^{4/} To the best of Ellipsat's knowledge, this band is not being currently used. In addition, 5150-5216 MHz is now authorized, by existing Radio Regulation 797A, for feeder links for the Radio-determination satellite service.

bands, and urged the Commission to support use of the bands 5000-5250 MHz for MSS feeder links.^{5/}

As well-documented in the comments, C-Band offers substantial advantages for LEO feeder links and can be used consistently with GSO operations. The United States should therefore support the allocations and rule revisions required to make the preferred C-Band spectrum available for LEO MSS feeder links.^{6/}

C. Reverse Band Working is Feasible

In its opening comments, Ellipsat supported reverse band sharing of the fixed satellite bands below 15 GHz as the best option for obtaining adequate feeder link spectrum for first-generation systems. As Ellipsat and others pointed out, the ITU working groups have concluded that reverse band sharing is feasible and will not cause harmful interference to FSS operations.^{7/} ITU Task Group 4/5 has found reverse band working to be technically feasible in the C, Ku, and Ka-Bands.

Nothing in the opening comments dissuades Ellipsat from its view that RBW is a promising solution. To the contrary, there is strong support in the comments for the reverse band working approach. For example, Comsat Mobile strongly endorsed use of

^{5/} Comments of Comsat Mobile Communications at 17.

^{6/} This would include revisions to RR 797A as proposed by Loral. See Loral Comments at 7-10.

^{7/} See Loral Comments at 7.

reverse band working in the FSS bands, and urged the Commission to seek further allocations and regulatory revisions at WRC-95 to take advantage of this spectrum sharing technique.^{8/}

There is no analysis or evidence in the comments inconsistent with the findings of Task Group 4/5 as to the feasibility of RBW. Although GE Americom categorically opposes sharing of the C or Ku bands by LEO and FSS services, there is no technical support for this sweeping opposition in its comments. GE does not consider the reverse band working approach anywhere in its filing and may have been unaware of the preliminary conclusions reached by ITU Task Group 4/5.

D. Allocations in a Range of Frequency Bands
Should Be Pursued by the United States

Although expressing a preference for C-Band feeder link spectrum, Ellipsat and other parties recommended that the United States pursue a range of frequency bands for feeder links.^{9/}

While Ellipsat's preferred C-Band options for its first generation system are noted above, the U.S. should take appropriate actions within the WRC process to achieve reverse band sharing of a broad range of FSS frequencies, including those identified in Exhibit A of Ellipsat's opening comments, in order to accommodate

^{8/} Comments of Comsat Mobile at 18. See also Loral Comments at 7.

^{9/} See, e.g., Loral Comments at 5-6.

future MSS systems and provide maximum coordination flexibility. For reasons more fully discussed in Ellipsat's comments, the Ka-Band is undesirable for feeder links in systems that utilize multiple on ground switching networks. However, the United States should still seek co-primary, co-directional (with FSS) Ka-Band allocations at 17.7-18.4 GHz (700 MHz) (Earth-to-space), 18.7-20.2 (1500 MHz) (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) in order to meet the diverse needs of the LEO MSS systems and to preserve the options for future feeder links.^{10/}

III.
THE COMMENTS OVERWHELMINGLY
SUPPORT MODIFICATION OF RR 2613

In its comments, Ellipsat supported clarification and/or modification of international radio regulation 2613 to ensure that the spectrum allocated to LEO MSS, for both primary and feeder links, is not relegated to secondary status.^{11/} The comments of other parties reflect this view and similarly recommend that RR 2613 be clarified. As Comsat World Systems points out, "[a] new approach is needed since it has become clear that the present application...of RR 2613 does not serve its originally

^{10/} See Loral Comments at 6.

^{11/} See, e.g. Comments of AirTouch Communications at 6.

intended purpose and is not suited to address new developments."^{12/}

At a minimum, the opening comments recommend that RR 2613 must be interpreted in accordance with the views of the Above 1 GHz MSS Negotiated Rulemaking Committee.^{13/} The Negotiated Rulemaking Committee interpreted RR 2613 to impose three conditions that must be met before a non-geostationary system would be required to cease or reduce transmissions in order to protect a GSO system. These are (1) the administrations of the systems involved must engage in bi-lateral or multi-lateral discussions and reach agreement as to the level of accepted interference; (2) after the systems are in operation, the non-geostationary system must exceed the level of interference agreed to; and (3) the interference in excess of the agreed level must be caused by the failure of the non-geostationary system to maintain sufficient angular separation between the satellites of the two systems.

This interpretation of RR 2613 should be adopted at a minimum. However, Ellipsat recommends that the Commission and the United States should go farther to ensure that the provisions of RR 2613 are not extended to feeder links operating in the reverse

^{12/} Comments of Comsat World Systems at 5.

^{13/} See Comments of TRW at 11-12.

band mode. Ellipsat strongly opposes extension of RR 2613 to reverse band operations.^{14/}

In addition, Ellipsat agrees with the views expressed by other parties that initiatives within ITU Task Group 4/5 offer a promising approach. Task Group 4/5 has developed a proposal in which FSS bands are categorized into three separate groups for purposes of determining the respective priority of LEO feeder links and GSO operations. Although further development of these categories is needed, Ellipsat believes that the Task Group 4/5 approach may be useful and should be explored further.^{15/}

IV.
IN ORDER TO FACILITATE MSS IMPLEMENTATION,
THE COMMISSION SHOULD SUPPORT OTHER RULE
REVISIONS PROPOSED IN THE COMMENTS

The comments filed by other parties supported several additional rule revisions, as did Ellipsat, that are needed to facilitate implementation of the LEO MSS systems. These rule revisions are as follows.

^{14/} Ellipsat agrees with Teledesic that the "basic bias against non-geostationary satellite systems" in RR 2613 is unacceptable. See Comments of Teledesic at 6. However, Ellipsat disagrees with Teledesic that the concept of balanced, equitable treatment should be limited to non-GSO FSS operations.

^{15/} See also Loral Comments at 12; Comments of Comsat World Systems. The only party to seek preservation of RR 2613, Hughes, does not appear to be familiar with the activities of Task Group 4/5.

Footnote 731E. Ellipsat agrees with the comments of other parties, including Loral, Constellation and TRW, that Footnote 731E must be revised to assure that MSS systems will have full use of the 1610-1626.5 MHz band. The final sentence of Footnote 731E should be deleted. This will allow the LEO systems to proceed without unnecessarily restrictive limits vis-a-vis GLONASS. Ellipsat agrees with Loral that revision of Footnote 731E could be accomplished without compromising the use of GLONASS as part of the Global Navigation Satellite System.^{16/} The suggestion of TRW, that RR 731E be modified or clarified to define the operating limit of -15 dBW/4kHz as a trigger value, also warrants serious consideration.

Footnote 753F. Ellipsat supports a relaxation of the power flux density limits to facilitate coordination with terrestrial fixed service systems in the 2483.5-2500 MHz band. Ellipsat also agrees with the comments of TRW and other parties that the PFD limits are properly interpreted as coordination triggers rather than absolute limits.^{17/} However, careful consideration should be given to the issue raised by Constellation in its comments with respect to the elevation angle for the PFD limits.^{18/}

^{16/} See Loral Comments at 15-18.

^{17/} See TRW Comments at 8-9.

^{18/} See Constellation Comments at 5-6.

Footnote 733E. Ellipsat agrees with other parties that Footnote 733E should be deleted as unnecessary and redundant following elevation of radioastronomy to co-primary status.

V.
THE ISSUE OF FUTURE MSS SPECTRUM
SHOULD BE ADDRESSED AT WRC-95

In its initial comments, Ellipsat recommended that the United States seek to accelerate the availability of 2 GHz spectrum for future expansion by the U.S. systems and also to accommodate new entrants. The comments filed by other parties similarly support the expedited availability of 2 GHz spectrum for the MSS systems. It is critical that spectrum be available on a global basis for the LEO systems.

As pointed out by Ellipsat and other parties, the issue of future spectrum is already or will shortly be considered by the LEO systems due to the long-lead time required for system planning and construction. For this reason, it is important that the issue of future spectrum be considered at WRC-95.

All of the LEO parties have urged the Commission to identify and seek allocation of suitable spectrum in the 2 GHz band. Several options are identified in the comments. For example, Loral has suggested that the 2390-2400 MHz and 2300-2310 MHz bands may be suitable. Constellation proposes the accelerated availability on a global primary basis of 1980-2010 MHz (1970-1980 MHz now allocated for uplinks in Region 2) and 2170-2200 MHz (2160-2170

MHz now allocated in Region 2 for downlinks).^{19/} Motorola recommends a global allocation of 1990-2025 MHz (Earth-to-space) and 2165-2200 MHz (space-to-Earth). In addition, Motorola suggests that a number of "Federal set aside" bands may be suitable for MSS use, including 1670-1675 MHz and 1710-1755 MHz; 2300-2310 MHz; and 1390-1400 MHz.^{20/}

While the suitability of the various bands proposed in the comments should be evaluated further, the proposals provide a useful starting point. Ellipsat continues to believe that acceleration of the availability of MSS spectrum allocated at WARC-92 should be seriously considered as an option. In this regard, Ellipsat strongly disagrees with Motorola's opposition to the advancement of the 2005 date. Given the compelling need for additional MSS spectrum, this option cannot be ruled out.

VI. CONCLUSION

For the reasons set forth above and in its previous comments, Ellipsat urges the Commission to take appropriate steps in

^{19/} See Constellation Comments at 7-8. As Constellation points out, it would be necessary to move the existing spectrum allocated by the ITU to MSS at 1970-1990 MHz in order to avoid overlap with the Commission's PCS allocation plan.

^{20/} Motorola Comments at 13-14. Although Motorola also suggests 3650-3700 MHz, in Ellipsat's view this band is not suitable. Only spectrum below 3 GHz should be considered for future MSS use.

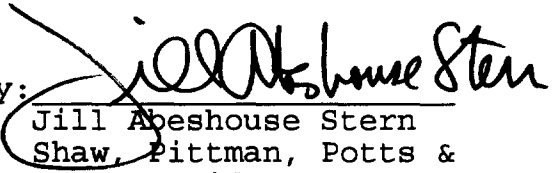
preparing for WRC-95 and future WRCs to focus attention on the various issues, including feeder link spectrum, coordination, and GLONASS relocation, that must be resolved expeditiously if the LEO MSS systems are to meet the promise they offer of providing cost-effective, innovative global communications services.

Respectfully submitted,

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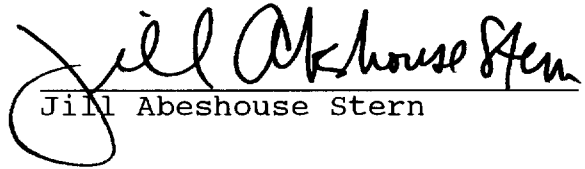
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